

REMARKS

Claims 1-16, 19 and 29-35 have been previously canceled and claim 26 is currently canceled. Claim 17 has been amended and no new claims have been added by way of this response. Thus, claims 17-18, 20-25 and 27-28 are currently pending and presented for examination. Applicants respectfully request reconsideration and allowance of the pending claims in view of the foregoing amendments and the following remarks.

Response to Rejections Under Section 102:

Claims 17, 19-20, 22 and 25-26 stand rejected under 35 U.S.C § 102(b), the Examiner contending that these claims are anticipated by Lewis et al. (USPN 5,837,960), hereinafter Lewis. Applicants have canceled claim 26 rendering its section 102 rejection moot.

Applicants have amended claim 17 to recite that the ceramic powder is provided "via a powder bed" and to include the limitation "wherein the shaped object is a net shaped object that requires no additional processing necessary before use" which both can find direct support in the substitute specification at page 5, paragraph [0022].

Applicants' claim 17 recites in part:

... wherein the forming of at least one of the first and second regions comprises **controlling densification, porosity and surface roughness to provide different material properties in the first and second regions of the shaped object ...**

...

wherein the shaped object is **a net shaped object that requires no additional processing necessary before use.**

Lewis teaches fabrication of metallic parts via directed light fabrication (DLF). The process of Lewis is not a **laser sintering** process as claimed by Applicants, but a laser deposition welding process.

The term "laser sintering" is an established, known term of the art that was already known before the priority date of the application. It is of course obvious that the laser beam must be moved over a large surface area to keep the powder at a specific sintering temperature, since a person skilled in the art knows that laser beams are relatively small in their diameter in relation to large components to be produced (for example casting molds).

In the case of laser sintering, a laser beam is moved over the material to be sintered, which is in a powder bed. The guiding or moving of the powder bed and/or the laser beam in

relation to each other is adequately disclosed in the disclosure by the term "scanned over." (see paragraph 0022).

In "Rapid Prototyping and flexible manufacturing", R.-J. Ahlers et al., 06-16-1997, Munich, the principle of selective laser sintering is described in Figure 2 in the article "Laser microfabrication of metallic parts". The term "selective" is used because it is not the entire powder of the powder bed (powder in Figure 2) that is sintered but only selected regions of the powder bed. To do so, a laser beam is moved over the powder bed by means of a mirror and a lens.

Similarly, in "Rapid Prototyping, Werkzeuge für die schnelle Produktentwicklung" [rapid prototyping, tools for rapid product development], Gebhardt, 1996, selective laser sintering is described on page 115 et seq., involving a laser beam being used as shown at the top of Figure 3-23 to produce a component by means of a laser and a tiltable mirror.

On page 119 et seq., a sintering station (2000) is also described, showing that there are such industrial installations that can put "rapid prototyping" into practice by means of laser sintering.

This enclosed prior art therefore shows that a person skilled in the art is well aware of what is meant by "laser sintering" with a powder bed and how the process is to be carried out. In addition, it is described in paragraph [0013] of the specification, that prior-art "rapid prototyping" processes are used in the production of ceramic objects (standard rapid prototypings). In particular, selective laser sintering is mentioned in this respect.

The disclosure according to Applicants claimed priority PCT publication in the final paragraph also makes it clear that the laser beam has to be moved, since the power of the laser is adapted to the respective regions to be densified, which are intended to be provided with different densities, that is to say the power is increased or reduced (greater or lower power, page 3, fourth-last line). This can only take place with a laser beam that is moved, since an overall irradiation of the part of the powder bed that is to be densified does not lead to different densities in different regions when the laser power is increased or reduced.

In paragraph [0009] of the specification, the US patents US 4,863,538 and US 5,132,143 are listed and it is explained that there the selective sintering of powder in a powder bed takes place layer by layer by means of a laser. This reference to the prior art by means of selective

sintering means that no further explanation was required for the term "laser sintering" in the disclosure of the invention, since it is a standardized process.

Therefore, Applicants claimed invention which recites "laser sintering" requires the employment of a powder bed. Applicants have amended claim 17 to clarify this matter. However, Lewis does not employ a powder bed, but instead the metal powder to be deposited are subsequently melted by a laser prior to impingement on the substrate (col. 5 line 52 to col. 6 line 11).

In addition, in the case of the laser deposition welding represented in Lewis, the material is not deposited over a surface area but in paths. This entails the problem that, if a number of paths of a melted material are placed next to one another to coat a larger surface area; they must be metallurgically bonded to one another. This problem is overcome in the case of Applicants laser sintering with a powder bed, since the powder particles in the powder bed are already "present" next to one another as the particles to be bonded to one another.

Therefore, Applicants submit that Lewis fails to teach "laser sintering." Furthermore, as pointed out by the Examiner at page 3 of the instant Office Action, Lewis controls the surface finish of the metallic part by the additional processing step of smoothing the object shape by laser ablation (col. 21 lines 14-22).

In contrast, Applicants' first and second laser sintering steps produce a net shaped ceramic object that Lewis is incapable of producing because Lewis requires the step of laser ablations. Therefore, Lewis can not teach or suggest **"...controlling densification, porosity and surface roughness to provide different material properties in the first and second regions of the shaped object ... wherein the shaped object is a net shaped object that requires no additional processing necessary before use"** as recited by claim 17.

MPEP 2131 requires "TO ANTICIPATE A CLAIM, THE REFERENCE MUST TEACH EVERY ELEMENT OF THE CLAIM."

In view of the above, claim 17 is not anticipated by Lewis. Furthermore, claims 19-20, 22 and 25 are also patentable at least based on their dependence from claim 17 as well as based on their own merits. Therefore, Applicants respectfully request that the Examiner withdraw the Section 102 rejections.

Response to Rejections Under Section 103:

Claims 18, 23-24 and 28 are rejected under 35 U.S.C § 103(a) as being unpatentable over Lewis. Claim 21 stands rejected under 35 U.S.C § 103(a), the Examiner contending that this claim is obvious over Lewis in view of Deckard (USPN 4,863,538). Claim 27 stands rejected under 35 U.S.C § 103(a), the Examiner contending that this claim is obvious over Lewis in view of Loschau (Ceramics: Getting into the 2000's).

For at least the reasons discussed in connection with the Section 102 rejections, Applicants respectfully submit that these claims are patentable at least based on their dependence from claim 17 as well as based on their own merits and respectfully request the Examiner to withdraw the Section 103 rejection.

Conclusion

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims. Accordingly, Applicants respectfully request that the Examiner reconsider the rejections and timely pass the application to allowance. All correspondence should continue to be directed to our below-listed address. Please grant any extensions of time required to enter this paper. The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

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By: Janet D. Hood
Janet D. Hood
Registration No. 61,142
(407) 736-4234

Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, New Jersey 08830